

ORIGINAL ARTICLE

# Contribution to the knowledge of Chinese Phasmatodea XI: New taxa and new nomenclature of Medaurini (Phasmatidae: Clitumninae) from China

Wai-Chun George Ho

Hong Kong Entomological Society, P.O. Box No.73749, Kowloon Central Post Office, Hong Kong, China; E-mail: georgehwc@hotmail.com

**Abstract** This paper describes two new genera and two new species, *Megacnipsomorpha* **gen nov.**, *Parapachymorpha granulata* **sp. nov.**, *Parapachymorpha parvicorne* **sp. nov.**, and *Spinoparachymorpha* **gen nov.**, from Medaurini of China.

**Key words** Stick insects, new genus, new species, new combination, China.

## 1 Introduction

In China, the stick insect tribe Medaurini Hennemann & Conle, 2008 includes six genera, 44 species and two subspecies (Chen & He, 2008; Hennemann *et al.*, 2008; Ho, 2017, 2020a, b; Brock *et al.*, 2021). Ho (2017) provided the first taxonomic study for the tribe. This paper is a supplementary for Ho (2017) and four new taxa from the Medaurini of China are described.

## 2 Materials and methods

The examined materials were pinned and dried. The terminology of armature used in this study is largely based on Rehn & Rehn (1939). Other morphological terms follow Bragg (2001), Zompro (2004) and Bradler (2009). Ootaxonomic descriptions refer to Clark (1976, 1988, 1998), Clark-Sellick (1997) and Zompro (2004). The sequence of genera and species is in alphabetical order. All measurements are given in millimetres (mm). The types of new taxa are deposited in Hong Kong Entomological Society, Hong Kong, China (HKES).

## 3 Taxonomy

### 3.1 *Megacnipsomorpha* **gen. nov.**

Type species: *Cnipsomorpha wenxuani* Ho, 2017: 508, by present designation.

Diagnosis. *Megacnipsomorpha* **gen nov.** is related to *Cnipsomorpha* Hennemann, Conle, Zhang & Liu, 2008, but can be separated by the large size of body, the more slender and elongate body, the absence of supra-orbital armature on the head and the well-developed serrations on the legs in the both sexes.

Description. Medium-sized for Clitumninae. Body spinose, slender and elongate. Apterous. Head oval, occiput convex

urn:lsid:zoobank.org:pub:B2514040-8935-47FE-8963-4B0C6F7FFB04

Received 19 September 2020, accepted 10 April 2021

Executive editor: Fuqiang Chen

with occipital medial spines, lacking supra-orbital spines. Antennae short, distinctly segmented, not surpassing apices of profemora. Thorax spinose. Pronotum nearly trapezoidal, moderately expanded posteriorly. Mesonotum elongate, moderately expanded posteriorly in both sexes, elongate and obscurely swollen medially in female. Metanotum longer than median segment. Mesopleurae and metapleurae with a supra-coxal spine. Abdomen spinose, cylindrical, with triangularly expanded posterolateral angles from second to eighth tergites. Female with a small and indistinct hump-like praeopercular organ on posteromedian area of seventh sternum. Anal segment with a small emargination on posterior margin in female, dilated into two laterally swollen semi-segments in male. Female with distinct and small supra-anal plate. Cerci cylindrical and short. Legs slender and long, femora armed with serrations, tibiae armed with serrations or unarmed.

Distribution. China.

Remarks. This new genus only contains the type-species, *Megacnipsomorpha wenxuani* (Ho, 2017) **comb. nov.** (transferred from *Cnipsomorpha*; type locality from Yunnan, China).

Etymology. The specific epithet of this new genus is derived from the Latin words ‘*Mega*’ (= large) and ‘*cnipsomorpha*’ referring to the close relationship with *Cnipsomorpha*.

### 3.2 *Parapachymorpha* Brunner von Wattenwyl, 1893

*Parapachymorpha* Brunner von Wattenwyl, 1893: 96. Type species: *Parapachymorpha nigra* Brunner von Wattenwyl, 1893: 96, by subsequent designation of Kirby, 1904: 342.

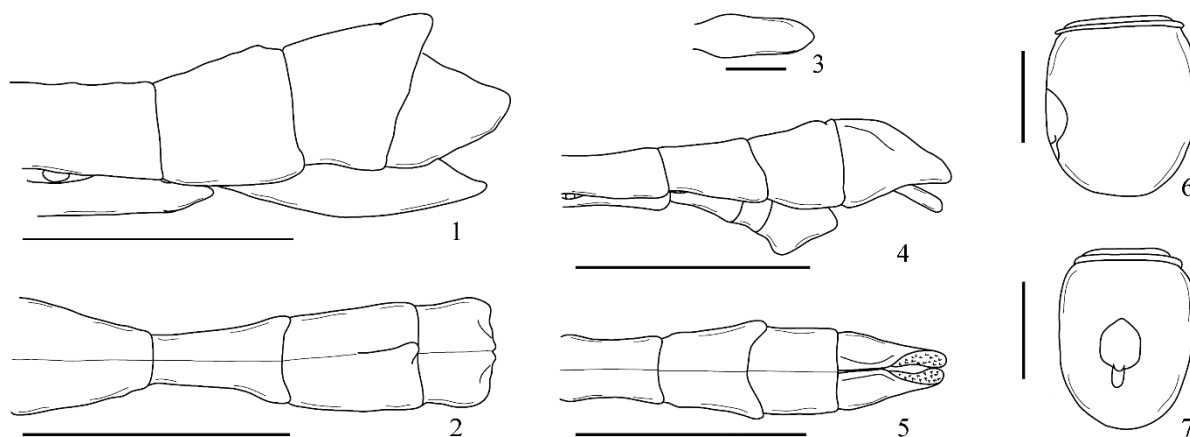
Description. Small to medium-sized for Clitumninae. Body slender. Apterous. Head rounded or oval, vertex unarmed or with paired armature, occiput unarmed, flat or gently convex. Antennae short, distinctly segmented, not surpassing apices of profemora. Thorax wrinkled and granulated. Pronotum unarmed. Mesonotum and metanotum unarmed or with one to two pairs of small spines. Abdomen cylindrical and unarmed. Female with distinct praeopercular organ on posteromedian area of seventh sternum. Anal segment with or without a small emargination on posterior margin in female, dilated into two semi-segments in male. Female subgenital plate short and scoop-shaped. Male poculum small and cup-shaped. Cerci small and short in both sexes. Legs slender, femora and tibiae waved with indistinct elevations or unarmed.

Distribution. China, Myanmar, Thailand and Vietnam.

Remarks. In China, five species are recognised including *P. apicalis* Ho, 2020, *P. dentata* Ho, 2017, *P. granulata* **sp. nov.**, *P. parvicorne* **sp. nov.** and *P. tridentata* Ho, 2020.

#### *Parapachymorpha granulata* **sp. nov.** (Figs 1–11)

Diagnosis. This new species is related to *P. parvicorne* **sp. nov.**, but can be distinguished by its larger size in the both sexes, the unarmed vertex of head, the 16-segmented antennae and the crest-like praeopercular organ on the seventh abdominal sternum in the female and the unarmed vertex of head and the pointed apices of anal abdominal semi-segments in the male.



Figures 1–7. *Parapachymorpha granulata* **sp. nov.** 1. Female apex of abdomen, lateral view. 2. Female apex of abdomen, dorsal view. 3. Female praeopercular organ, ventral view. 4. Male apex of abdomen, lateral view. 5. Male apex of abdomen, dorsal view. 6. Egg, lateral view. 7. Egg, dorsal view. Scale bars: 1–2, 4–5 = 5 mm, 3, 6–7 = 1 mm.

**Description.** Female. Small size. Body slender, more robust than male. General colouration of body and legs brown. Head oval, longer than wide, sparsely covered with small granules. Vertex flat, unarmed. Occiput gently convex, median longitudinal furrow distinct, with a pair of large granules near post-median area of median longitudinal furrow. Compound eyes small and rounded, its length about three times that of genae. Antennae sparsely covered with long bristles, with 16 segments, shorter than mesonotum, reaching subapical area of profemora; scapus oval, constricted posteriorly, dorsoventrally flattened, longer than pedicellus, lacking median longitudinal carina, longer than third segment; and pedicellus cylindrical, shorter than third segment. Thorax wrinkled and sparsely covered with small granules. Pronotum trapezoidal, gently expanded posteriorly, shorter than head; anterior margin curved inwards, posterior margin rounded, transverse and longitudinal sulci crossing just after middle point. Mesonotum moderately expanded posteriorly, median longitudinal carina indistinct, lateral margins with a few enlarged granules. Metanotum rectangular, longer than wide, longer than median segment, median longitudinal carina indistinct. Abdomen cylindrical, tapering posteriorly. Wrinkled and sparsely granulated. Median segment rectangular, two times wider than long. Seventh sternum with a horn-like praepocercal organ posteromedially, tapering apically, apex pointed and pointing posteriorly. Ninth tergum almost as long as eighth tergum, with a small posteromedian crest. Anal segment shorter than ninth tergum, posterior margin with a small notch. Subgenital plate scoop-shaped, tapering posteriorly, apex pointed and reaching posterior area of anal segment. Cerci short, flattened, apices rounded and not surpassing posterior margin of anal segment. Legs sparsely covered with short bristles. Femora thicker than corresponding tibiae, carinae with small obtuse dentations. Profemora distinctly curved basally. Tibiae roughly as long as corresponding femora, with small obtuse dentations.

**Male.** Body slim, distinctly more slender than female. General colouration of body and legs brown or dark brown. Head sparsely granulated. Oval, posteriorly constricted behind compound eyes. Vertex flat, with a pair of small obscure hump-like elevations between compound eyes. Occiput flat, median and lateral longitudinal furrows indistinct. Compound eyes small and rounded, its length about three times that of genae. Antennae with 17–18 segments; scapus flattened, constricted basally, longer than pedicellus, as long as third segment. Thorax unarmed, sparsely covered with a few small granules. Pronotum rectangular, longer than wide, shorter than head, anterior margin curved inwards, posterior margin truncate, transverse and longitudinal sulci crossing at middle area. Mesonotum slender and elongate, gently expanded in second half. Metanotum about four to five times length of median segment. Abdomen slender and cylindrical. Median segment square. Second to seventh tergites parallel-sided. Eighth tergum expanded posteriorly, longer than ninth tergum. Anal segment as long as eighth tergum, split into two semi-tergites, tapering posteriorly, inner margins curved, apices pointed, triangle-shaped in lateral view, inner surface with minute dentations. Poculum cup-shaped, with rounded posterior margin, reaching posterior area of ninth tergum. Cerci cylindrical basally, flattened apically, short, slightly incurved, apices rounded and reaching posterior apices of anal segment. Legs very slender and long, sparsely covered with long bristles. Unarmed. Femora thicker than corresponding tibiae, roughly as long as corresponding tibiae, anterodorsal, posterodorsal, anteroventral and posteroventral carinae indistinctly waved. Profemora curved basally. Tibiae unarmed, medioventral carina raised basally.

**Measurements.** Length. Body, ♀ 43.0 mm, ♂ 37.0–42.0 mm; antennae, ♀ 7.0–8.0 mm, ♂ 8.0–9.0 mm; head, ♀ 3.5–4.0 mm, ♂ 2.5–3.0 mm; pronotum, ♀ 3.0 mm, ♂ 2.0 mm; mesonotum, ♀ 8.5–9.0 mm, ♂ 8.0–9.0 mm; metanotum, ♀ 4.0 mm, ♂ 4.5–5.5 mm; median segment, ♀ 1.5 mm, ♂ 1.0–1.5 mm; profemora, ♀ 16.0 mm, ♂ 17.0–18.5 mm; mesofemora, ♀ 10.0 mm, ♂ 10.0–11.5 mm; metafemora, ♀ 13.0–14.0 mm, ♂ 14.0–15.0 mm; protibiae, ♀ 16.0–17.0 mm, ♂ 18.0–23.0 mm; mesotibiae, ♀ 10.0 mm, ♂ 11.0–13.0 mm; metatibiae, ♀ 14.0–15.0 mm, ♂ 15.0–19.0 mm.

**Egg.** Capsule brown, densely granulated; oval, posteriorly rounded. Micropylar plate oval. Micropylar cup placed at posterior margin of micropylar plate. Median line short, about one-third length of micropylar plate. Operculum centrally



Figures 8–11. *Parapachymorpha granulata* sp. nov. 8. Female habitus. 9. Male habitus. 10. Female head and thorax, dorsolateral view. 11. Male head and thorax, dorsolateral view. Scale bars = 5 mm.

depressed with a closed-stalked capitulum.

Measurements. Capsule length 1.7 mm, width 1.4 mm, height 1.5 mm.

Material examined. Holotype ♀, China, Yunnan, Honghe, Jinping, 2000 m, 26 August 2019, George Ho Wai-Chun.

Paratypes. 2♀8♂, 10 eggs, same data as holotype.

Distribution. China.

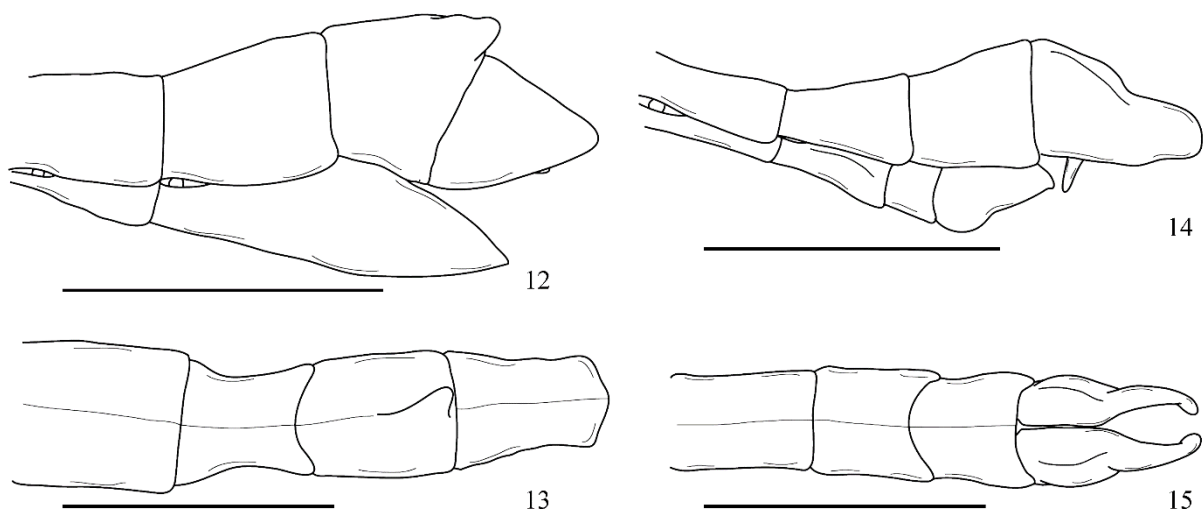
Etymology. The specific epithet of this new species is derived from the granulations on the body in the both sexes.

***Parapachymorpha parvicorne* sp. nov.** (Figs 12–19)

**Diagnosis.** This new species is related to *P. granulata* sp. nov., but can be separated by the presence of supra-antennal armature on the vertex of head, the 14-segmented antennae and the presence of posterolateral expansions on the seventh abdominal tergum in the female and the obtuse apices of anal abdominal semi-segments in the male.

**Description.** Female. Small size. Body robust. General colouration of body and legs dark brown with light brown markings. Head oval, longer than wide, sparsely covered with small granules. Vertex flat, armed with a pair of small and short horns between compound eyes. Occiput gently convex, unarmed, median longitudinal furrow distinct. Compound eyes small and rounded, its length about three times that of genae. Antennae sparsely covered with long bristles, with 14 segments, shorter than mesonotum, reaching subapical area of profemora; scapus oval, constricted posteriorly, dorsoventrally flattened, longer than pedicellus, lacking median longitudinal carina; pedicellus cylindrical, shorter than third segment; and third segment shorter than scapus. Thorax wrinkled and covered with sparse and small granules. Pronotum trapezoidal, gently expanded posteriorly, shorter than head; anterior margin curved inwards, posterior margin truncate, transverse and longitudinal sulci crossing just after middle point. Mesonotum moderately expanded posteriorly, median longitudinal carina indistinct, lateral margins with a few enlarged granules. Metanotum longer than median segment, median longitudinal carina indistinct. Abdomen cylindrical, tapering posteriorly. Wrinkled and sparsely granulated. Median segment rectangular, two times wider than long. Seventh sternum with a small hump-like praeopercular organ posteromedially. Eighth tergum longer than ninth tergum. Ninth tergum longer than eighth tergum, with a small posteromedian crest. Anal segment shorter than ninth tergum, tapering posteriorly, apex rounded. Subgenital plate scoop-shaped, tapering posteriorly, apex pointed and reaching middle area of anal segment. Cerci short, flattened, apices pointed and not surpassing posterior margin of anal segment. Legs sparsely covered with short bristles. Femora thicker than corresponding tibiae, with small dentations. Profemora distinctly curved basally. Tibiae longer than corresponding femora, with small dentations, medioventral carina raised basally.

Male. Body slender, distinctly more slender and longer than female. General colouration of body and legs brown. Head sparsely granulated. Oval, posteriorly constricted behind compound eyes. Vertex with a pair of small granule-like horns between compound eyes. Occiput convex, median and lateral longitudinal furrows indistinct. Compound eyes small and rounded, its length about three times that of genae. Antennae with 15–18 segments; scapus flattened, constricted basally,



Figures 12–15. *Parapachymorpha parvicorne* gen. & sp. nov. 12. Female apex of abdomen, lateral view. 13. Female apex of abdomen, dorsal view. 14. Male apex of abdomen, lateral view. 15. Male apex of abdomen, dorsal view. Scale bars = 5 mm.

longer than pedicellus, as long as third segment. Thorax unarmed, sparsely covered with a few small granules. Pronotum rectangular, longer than wide, shorter than head, anterior margin curved inwards, posterior margin truncate, transverse and longitudinal sulci crossing at middle area. Mesonotum slender and elongate, gently expanded in second half. Metanotum more than three times length of median segment. Abdomen slender and cylindrical. Median segment longer than wide. Second to seventh tergites parallel-sided. Eighth tergum expanded posteriorly, as long as ninth tergum. Anal segment longer than ninth tergum, split into two elongate semi-tergites, tapering posteriorly, inner margins curved, apices obtuse, inner surface with minute dentations. Poculum cup-shaped, with rounded posterior margin, reaching anterior area of anal segment. Cerci cylindrical, small and short, straight, apices pointed and not surpassing posterior apices of anal segment. Legs very slender and long, sparsely covered with long bristles. Femora thicker than corresponding tibiae. Profemora curved basally. Tibiae longer than corresponding femora, medioventral carina raised basally.

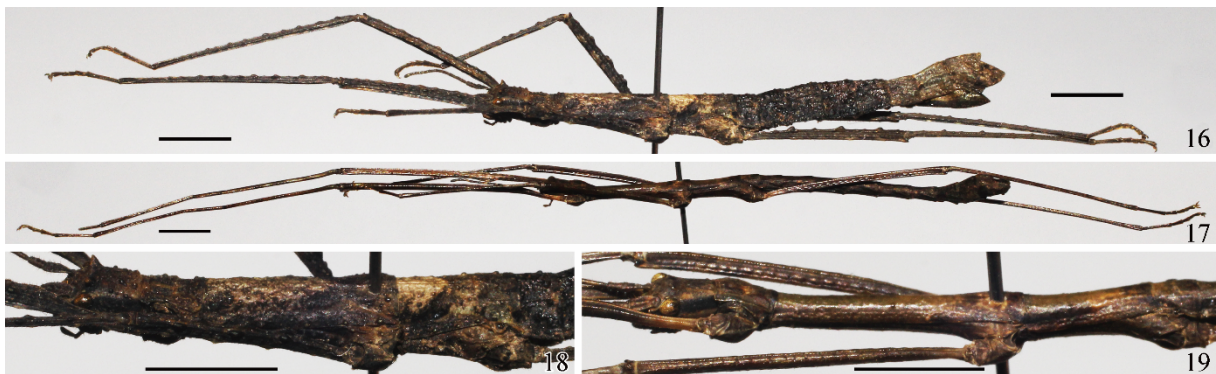
Measurements. Length. Body, ♀ 35.0 mm, ♂ 34.0–39.0 mm; antennae, ♀ 6.0 mm, ♂ 7.0–8.5 mm; head, ♀ 3.0 mm, ♂ 2.5 mm; pronotum, ♀ 2.5 mm, ♂ 2.0 mm; mesonotum, ♀ 7.0 mm, ♂ 7.5–8.0 mm; metanotum, ♀ 3.5 mm, ♂ 4.0 mm; median segment, ♀ 1.0 mm, ♂ 1.0–1.5 mm; profemora, ♀ 12.0 mm, ♂ 17.0–21.0 mm; mesofemora, ♀ 8.0 mm, ♂ 10.5–12.5 mm; metafemora, ♀ 11.0 mm, ♂ 13.0–18.0 mm; protibiae, ♀ 14.0 mm, ♂ 18.0–23.0 mm; mesotibiae, ♀ 9.0 mm, ♂ 11.5–13.5 mm; metatibiae, ♀ 13.0 mm, ♂ 15.0–21.0 mm.

Material examined. Holotype ♀, China, Yunnan, Yuxi, Xinping, 2400 m, 24 June 2019, George Ho Wai-Chun. Paratypes. 1 ♀ (immature), 6 ♂, same data as holotype.

Distribution. China.

Remarks. The description, illustrations and measurements of female are only given to the adult holotype.

Etymology. The specific epithet of this new species is derived from the small horns on the vertex of head in the female.



Figures 16–19. *Parapachymorpha parvicorne* sp. nov. 16. Female habitus. 17. Male habitus. 18. Female head and thorax, dorsolateral view. 19. Male head and thorax, dorsolateral view. Scale bars = 5 mm.

### 3.3 *Spinoparapachymorpha* gen. nov.

Type species: *Parapachymorpha sinica* Ho, 2017: 530, by present designation.

Diagnosis. *Spinoparapachymorpha* gen. nov. is related to *Parapachymorpha* Brunner von Wattenwyl, 1893, but can be easily separated by the distinctly spinose head and abdomen in the both sexes.

Description. Medium-sized for Clitumninae. Body slender and elongate. Apterous. Head oval, occiput convex and armed with occipital medial spines. Vertex with or lacking paired supra-antennal armature. Antennae short, distinctly segmented, not surpassing apices of profemora. Thorax spinose. Pronotum trapezoidal and moderately expanded posteriorly in female, rectangular and longer than wide in male. Mesonotum expanded posteriorly, with two to four pairs of spines. Abdomen spinose, cylindrical, seventh tergum with or lacking posterolateral expansions in female. Female with distinct praepercular organ on posteromedian area of seventh sternum. Anal segment with emarginated posterior margin in female, dilated into two distinct semi-segments in male. Subgenital plate short and scoop-shaped. Cerci short. Legs slender and long, femora and tibiae armed with serrations or unarmed.

Distribution. China, Laos, Myanmar, Thailand and Vietnam.

Remarks. This new genus consists of seven species, including *S. daoyingi* (Ho, 2014) **comb. nov.** (type locality from Yunnan, China), *S. jinpingensis* (Ho, 2017) **comb. nov.** (type locality from Yunnan, China), *S. pseudospinosa* (Ho, 2020) **comb. nov.** (type locality from Vietnam, not occurring in China), *S. sinica* (Ho, 2017) **comb. nov.** (type locality from Yunnan, China), *S. spinosa* (Brunner von Wattenwyl, 1893) **comb. nov.** (type locality from Myanmar, not occurring in China),



*S. tetracantha* (Chen & He, 2001) **comb. nov.** (type locality from Yunnan, China) and *S. xishuangbannanensis* (Ho, 2014) **comb. nov.** (type locality from Yunnan, China). All these species matched the features of *Spinoparachymorpha* **gen nov.** and were transferred from *Parapachymorpha* Brunner von Wattenwyl, 1893. A total of five species are recognised in China while other two species are known from Myanmar and Vietnam (Ho, 2020a, b, c).

Etymology. The specific epithet of this new genus is derived from the Latin words ‘*Spino*’ (= spiny) and ‘*parapachymorpha*’ referring to the close relationship with *Parapachymorpha* Brunner von Wattenwyl, 1893.

**Acknowledgements** I wish to thank Mr. Zhiyong Yu (Yunnan, China) for his kind assistance and the anonymous reviewers for providing valuable comments to improve the manuscript.

## References

- Bradler, S. 2009. Die Phylogenie der Stab- und Gespenstschrecken (Insecta: Phasmatodea). *Species, Phylogeny and Evolution*, 2: 3–139.
- Bragg, P.E. 2001. *Phasmids of Borneo*. Natural History Publications, Kota Kinabalu. 772pp.
- Brock, P.D., Büscher, T., Baker, E. 2021. Phasmida Species File Online. Version 5.0/5.0. Available from <http://phasmda.speciesfile.org/HomePage/Phasmida/HomePage.aspx> (accessed 1 April 2021).
- Brunner von Wattenwyl, K. 1893. Révision du Système des Orthoptères et description des espèces rapportées par M. Leonardo Fea de Birmanie. *Annali del Museo Civico di storia naturale Giacomo Doria, Genova*, (2)13(33): 1–230.
- Chen, S.C., He, Y.H. 2001. Two new record genera and new species of Phasmatodea from China (Phasmatodea: Phasmatidae, Heteronemiidae). *Entomological Journal of East China*, 10(1): 8–10.
- Chen, S.C., He, Y.H. 2008. *Phasmatodea of China*. China Forestry Publishing House, Beijing, China. 476pp.
- Clark, J.T. 1976. The capitulum of phasmid eggs (Insecta: Phasmida). *Zoological Journal of the Linnean Society*, 59: 365–375.
- Clark, J.T. 1988. The capitula of phasmid eggs: an update with a review of the current state of phasmid ootaxonomy. *Zoological Journal of the Linnean Society*, 93: 273–282.
- Clark, J.T. 1998. The micropylar plate of the eggs of Phasmida, with a survey of the range of plate form within the order. *Systematic Entomology*, 23: 203–228.
- Clark-Sellick, J.T. 1997. The range of egg capsule morphology within the Phasmatodea and its relevance to the taxonomy of the order. *Italian Journal of Zoology*, 64: 97–104.
- Hennemann, F.H., Conle, O.V. 2008. Revision of Oriental Phasmatodea: The tribe Pharnaciini Günther, 1953, including the description of the world's longest insect, and a survey of the family Phasmatidae Gray, 1835 with keys to the subfamilies and tribes (Phasmatodea: "Anareolatae": Phasmatidae). *Zootaxa*, 1906: 1–316.
- Hennemann, F.H., Conle, O.V., Zhang, W.W., Liu, Y. 2008. Descriptions of a new genus and three new species of Phasmatodea from Southwest China (Insecta: Phasmatodea). *Zootaxa*, 1701: 40–62.
- Ho, G.W.C. 2014. A review of the genus *Parapachymorpha* Brunner von Wattenwyl (Phasmatodea: Phasmatidae) from China, with descriptions of two new species. *Acta Entomologica Sinica*, 57(2): 244–247.
- Ho, G.W.C. 2017. Contribution to the knowledge of Chinese Phasmatodea IV: Taxonomy on Medaurini (Phasmatodea: Phasmatidae: Clitumninae) of China. *Zootaxa*, 4365(5): 501–546.
- Ho, G.W.C. 2020a. Two new species of the genus *Parapachymorpha* Brunner von Wattenwyl, 1893 (Phasmida: Phasmatidae: Clitumninae: Medaurini) from China. *Hong Kong Entomological Bulletin*, 12(1): 3–9.
- Ho, G.W.C. 2020b. Contribution to the knowledge of Chinese Phasmatodea VI: New taxa and new nomenclature of the subfamily Necrosiinae from the Phasmatodea of China. *Hong Kong Entomological Bulletin*, 12(2): 3–28.
- Ho, G.W.C. 2020c. New taxa of Clitumninae from Vietnam (Phasmatodea: Phasmatidae). *Zoological Systematics*, 45(2): 104–117.
- Kirby, W.F. 1904. *A Synonymic Catalogue of Orthoptera 1. Orthoptera Euplexoptera, Cursoria et Gressoria. (Forficulidae, Hemimeridae, Blattidae, Mantidae, Phasmidae)*. British Museum, London. 501pp.
- Rehn, J.A.G., Rehn, J.W.H. 1939(1938). The Orthoptera of the Philippine Islands. Part I Phasmatidae; Obriminae. *Proceedings of the Academy of Natural Sciences, Philadelphia*, 90: 389–487.
- Zompro, O. 2004. Revision of the genera of the Areolatae, including the status of *Timema* and *Agathemera* (Insecta, Phasmatodea). *Abhandlungen des Naturwissenschaftlichen Vereins Hamburg, (NF)37*: 1–327.